

The Effects of the Testa Nematode,
Aphelenchoides arachidis, on Peanuts

D. E. Stokes

In 1970, a nematode was isolated by D. McDonald from diseased seeds of peanuts, Arachis hypogaea L., in Samaru, Nigeria. The nematode was later described and named the testa nematode, Aphelenchoides arachidis Bos. Aphelenchoides species, which parasitize higher plants, most often feed on foliage or meristematic bud tissue, thus making A. arachidis somewhat unusual in its parasitism. Other species of Aphelenchoides are also known to be seed-borne. Aphelenchoides besseyi Christie, infects rice and A. ritzemabosi (Schwartz) Steiner, infects seeds of China aster, Callistephus chinensis (L.) Nees.

Effects of the Nematode on Peanut Plant Parts.

Aphelenchoides arachidis occurs as an endoparasite on tissues of the pods, testas (seed coat), roots, and hypocotyls. Buds of peanut cultivar 'Spanish 205' infected by A. arachidis yielded more than 35,000 nematodes per seed pod. Discolored seeds taken from unshelled pods were heavily infected by the nematode and were nearly 12g per 100 seeds lighter than normal appearing seeds that were only lightly infected by the nematodes. Some nematode-infected testas contained more than 35,000 nematodes. The nematodes were located mainly in the subepidermal parenchymatous layer and around tracheids. Testas infected by A. arachidis were thicker and more uneven than normal testas. The epidermal layer of the testa was reduced by infection, and the basal tissues, including the aleurone layer, were disorganized.

Heavily infected seeds had translucent testas shortly after removal of the fully mature pods. These seeds were also a lighter brown and had darker vascular strands within the testas.

Aphelenchoides arachidis also was found in hypocotyls and roots of emerging peanut plants. Nematode invasion of pods occurred 10 days after fruiting pegs had penetrated the soil. Larger numbers of nematodes did not occur in pegs until after 60 days.

Large populations of A. arachidis can result in reduced peanut quality and yield. Feeding by these seed-borne nematodes can devalue confectionary peanuts because of shrivelled, discolored, and lighter seeds. Infected seeds of 'Spanish 205' peanuts weighed up to 33% less than healthy seeds.

Survival in Storage

A. arachidis can survive desiccation in normal storage of peanuts. Approximately 51% of the nematodes found in peanut pods were alive after four months storage.

Control

Infected peanut seeds immersed in water heated to 60 C for 5 minutes eliminated A. arachidis. Hot water treatment neither reduced germination percentage nor peanut yields.

Geographic Distribution

The testa nematode, Aphelenchoides arachidis, is known to occur only in the vicinity of Samaru, Nigeria.

Host Range

The following peanut cultivars 'S-38', 'F-439.4', 'U.S.-608', 'U.S.-617', 'U.S.-618', 'S-61', and 'Spanish 205' are the only known hosts of A. arachidis.

Survey and Detection

- 1) Periodic inspections should be made of firms processing large quantities of seed peanuts.
- 2) Peanut lots with many shrivelled and discolored seeds should be suspected of infection by the testa nematode, Aphelenchoides arachidis.
- 3) Suspect seeds should be collected and submitted to the Nematology Bureau for analysis.

References

- 1) Bos, W. S. 1977. Aphelenchoides arachidis n. sp. (Nematode:Aphelenchoidea), an endoparasite of the testa of groundnuts in Nigeria. Z. Pflanzekr. Pflanzenschutz 84:95-99.
- 2) Bridge, J., W. S. Bos, L. J. Page, and D. McDonald. 1977. The biology and possible importance of Aphelenchoides arachidis, a seed-borne endoparasitic nematode of groundnuts from northern Nigeria. Nematologica 23:253-259.
- 3) McDonald, D., W. S. Bos, and M. H. Gumel. 1979. Effects of infection of peanut (groundnut) seed by the testa nematode, Aphelenchoides arachidis, on seed infection by fungi and on seedling emergence. Plant Dis. Reprtr. 63:464-467.